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a Survey of Federal Programs in Higher Education

SUMMARY

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U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education

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a Survey *of* Federal Programs *in* Higher Education

SUMMARY

Describing the Programs, Participating Institutions, and the Effects of the Programs on the Institutions

By J. KENNETH LITTLE
Director of the Survey

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Education

HE 5.34

The full report of the *Survey of Federal Programs in Higher Education* will be available as Office of Education Bulletin 1963, No. 6 (OE-50034). In addition to the complete reports of the three parts of the *Survey*, it contains a list of sources of data on Federal programs and a directory of the offices in the Federal agencies and departments that administer programs in higher education.

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Letter of Transmittal

AUGUST 20, 1962.

The Honorable STERLING M. MCMURRIN
Commissioner of Education
U.S. Department of Health, Education, and Welfare
Washington 25, D.C.

DEAR DR. MCMURRIN:

I am submitting herewith a report of the Survey of Federal Programs in Higher Education.

This report was developed pursuant to title X, section 1001(d), of the National Defense Education Act of 1958, which directed the Secretary of Health, Education, and Welfare "to advise and consult with the heads of departments and agencies of the Federal Government responsible for the administration of scholarship, fellowship, or other educational programs with a view to securing full information concerning all specialized scholarship, fellowship, or other educational programs administered by or under any such department or agency and to developing policies and procedures which will strengthen the educational programs and objectives of the institutions of higher education utilized for such purposes by any such department or agency."

The report is organized in three parts. Part I is an account of the nature, scope, and volume of federally sponsored programs in colleges and universities of the United States and the institutions which participate in them. This description is directed toward the request for "full information" about federally sponsored programs.

Part II reports findings concerning significant and specific concomitants of federally sponsored activity as seen in a sample of 36 colleges and universities. The institutions include 12 universities that are heavily involved in Federal programs, 12 universities that are less involved, and 12 strong undergraduate colleges. This part examines the effects of present Federal programs on institutions of higher education as factors for "developing policies and procedures which will strengthen the educational programs and objectives of the institutions of higher education. . . ."

The information in part II is based on a study performed for the Office of Education by the Brookings Institution. Since the study dealt with relationships of colleges and universities to all Federal departments and agencies, and because the U.S. Department of Health, Education, and Welfare is a major sponsor of Federal programs in institutions of higher education, the Brookings Institution, a nongovernmental agency, was asked to conduct the basic studies which underlie this part of the report. The complete report of the Brookings study will be published by the Institution.

Part III discusses the implications of the information presented in parts I and II for "policies and procedures which will strengthen the educational programs and objectives of institutions of higher education" and makes certain specific recommendations.

I have been greatly helped in developing this report by the following members of an advisory committee who, individually and as a group, gave counsel about

the design of the study and the interpretation of its findings. The responsibility for the substance of the report, however, is solely mine. The members of the Advisory Committee were not asked to approve the report nor to endorse its recommendations.

McGeorge Bundy, dean of the faculty of arts and sciences, Harvard University (resigned from the committee in 1961 when appointed special assistant to the President of the United States)

Felton G. Clark, president, Southern University

Lee A. DuBridge, president, California Institute of Technology

John E. Ivey, Jr. (chairman), special consultant to the president, Michigan State University

Douglas Knight, president, Lawrence College

Herbert E. Longenecker, president, Tulane University

Bowen C. Dees, assistant director for scientific personnel and education, National Science Foundation (invited to participate in meetings of the committee because of the responsibility of the National Science Foundation in the science and science-education aspects of the study)

Charles E. Odegaard, president, University of Washington

John A. Perkins, president, University of Delaware

Paul C. Reinert, president, St. Louis University

M. H. Trytten, director, Office of Scientific Personnel, National Academy of Science

John C. Weaver, vice president for research and dean of the Graduate College, the State University of Iowa

Helen C. White, professor, Department of English, University of Wisconsin

I report with high satisfaction the excellent cooperation given by staff members of all Federal departments and agencies in compiling and interpreting the extensive statistical data and other information which the survey required. The staff members of the Brookings Institution who participated in fashioning and executing the studies for part II also greatly assisted in accomplishing the objectives of the survey.

This report was accomplished with the capable and diligent assistance of a small corps of faithful assistants who were recruited from both within and outside the permanent staff of the Office of Education. The liaison activities with Federal agencies and departments were efficiently and expertly executed by William G. Land. Responsibility for the endless detail of guiding preliminary drafts of this report to their final form was assumed and fulfilled with high competence by Gordon M. Ambach. Others who assisted in assembling and analyzing the information and preparing the report were Bernice Strawn, Joyce Stern, and Virginia Hart. To the many, many other persons who gave counsel, information, time, and effort to this project, I record my sincere thanks and appreciation.

I hope that the report has succeeded in accomplishing its primary purposes to your satisfaction, and that its contents will be useful to Members of Congress, educators, and all citizens who are interested in the subject it treats.

Respectfully yours,

J. Kenneth Little,
Director, Survey of Federal Programs in Higher Education

Foreword

SINCE THE FIRST Morrill Land-Grant Act a century ago, the Federal Government has been directly concerned with higher education. Until the 1940's this involved relatively few institutions and, after the initial grants, comparatively small sums for support. This Federal aid, however, was of great importance to the development of American higher education. World War II began a new era in this relationship, as the colleges and universities were called upon to train the manpower and develop the techniques and weaponry necessary for the pursuit of war and the restoration of peace.

After the war, the involvement of the Federal Government with higher education was intensified. The adjustment of persons and institutions to the conditions of an uneasy peace, the rebuilding of devastated countries, and the establishment of a highly technical security system, together with the Nation's assumption of the responsibility for strengthening the free world, made new demands on our educational resources. The people, through the Federal Government, looked and continue to look to the colleges and universities for the preparation of professional manpower, the advisory services of faculty experts, advanced research in a great variety of fields, and the execution of training programs, both domestic and foreign. The Federal Government has become one of the principal agencies of assistance to students, funds for specialized equipment and housing, and support for research.

In view of the large role that the Federal Government plays in matters pertaining to higher education, it is of great importance that the impact of its activities on universities and colleges be fully understood. Accordingly, acting under authority from the Congress (the National Defense Education Act) delegated to him by the Secretary of Health, Education, and Welfare, Commissioner Lawrence G. Derthick in February 1960 appointed Dr. J. Kenneth Little, professor of educational psychology at the University of Wisconsin and associate director of the Committee on Institutional Cooperation of the Big Ten Universities and the University of Chicago, to direct a study. The project had three parts, as indicated by the structure of this summary.

1. A report on the Federal programs in higher education and the participating institutions, written by Dr. Little employing data from the Federal departments and agencies.
2. A study of the effects of Federal programs in 36 institutions of higher education, contracted by the Office of Education to the Brookings Institution and directed by Dr. Harold Orlans. (In the present volume materials from the Brookings study have been selected and summarized by Dr. Little.)
3. Observations and recommendations on the Federal role in higher education based on the evidence of parts 1 and 2 as well as opinions of administrators in higher education across the Nation. This part was also written by Dr. Little.

The director of the survey has recently submitted his report to this Office. We are pleased to make this summary available in advance of the publication of the entire study.

I commend Dr. Little and Dr. Orlans for their accomplishment in the preparation of these studies and also express appreciation to all those who in any way have assisted them. In recommending this report to all who are interested in the organization, administration, and character of American education, I urge careful consideration of one of its principal concerns: whatever relationship our colleges and universities may have to the Federal Government in the future, it is essential not only to them as institutions but also to the character of our intellectual life as a Nation and, indeed, to the very quality of our culture, that they maintain their institutional independence and autonomy and in every way protect the integrity of their purpose.

This survey is a major bench mark for the comprehension of issues that must be resolved in formulating future Federal policies on matters pertaining to higher education. The report with its recommendations is now under consideration in the Office of Education. In addition to this and other works in the field, this Office now has the advantage of a newly established consultative group comprised of the directors or representatives of the Federal departments and agencies with major programs in education. This group has been assembled for the purpose of continuing cooperation on policies and operation of Federal programs at all levels of education. With the information and recommendations provided by such studies and through the assistance and cooperation of these departments and agencies, the Federal Government is in a better position to develop policies and programs that will help to strengthen this Nation's institutions of higher education.

STERLING M. MCMURRIN
Commissioner of Education

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PART I

Programs and Participating Institutions

Introduction

This part of the survey is a description of the variety, scope, and magnitude of Federal education programs and of the characteristics and relative involvement of participating institutions. "Education programs" are defined broadly as all programs in which a Federal department or agency makes a formal arrangement (e.g., agreement, contract, or grant) directly with an institution of higher education. In this study the programs are grouped under the following headings:

1. Research and development.
2. Facilities and equipment.
3. Education and training.
4. Financial assistance to individual students.
5. International education.

There is no attempt to evaluate the programs of individual agencies. The purpose is rather to assemble the kind of information that describes federally sponsored programs, taken as a whole, and the impact of federally sponsored activity upon the programs and objectives of the Nation's colleges and universities, taken as a whole.

The collection of data for this study began in the early months of 1960. Much of the information, therefore, is based on 1959 data. It was not feasible to collect completely new information or to revise all the data on hand as the 1960 figures became available. Some of the information on research, international programs, and total Federal income is for 1960, while that for education and training, student assistance, and facilities and equipment is reported for 1959.

Overview

The Federal Government both gives to and receives services from the Nation's colleges and universities toward accomplishing a variety of national goals. In some instances, the goals themselves are primarily educational; in other cases, however, as with certain aspects

of national defense, the Federal Government depends on research, training or advisory services to attain goals not primarily educational in purpose.

Federal programs provide these types of direct assistance to colleges and universities, or to students:

1. Loans and grants to construct research laboratories or other facilities for specified purposes or to purchase special types of research or instructional equipment.
2. Loans for the construction of housing and other facilities for students.
3. Transfer of surplus real property.
4. Grants to augment research staffs in specified fields.
5. Institutional grants to strengthen specified programs according to needs determined by the institutions.
6. Appropriations to share with the States the costs of instruction, research, and extension services in agriculture and the mechanical arts.
7. Financial assistance to students through loans, fellowships, veterans benefits, subsistence allowances, and other forms of subvention, including scholarships for war orphans.

For the following major activities, the Federal Government relies heavily on the resources of colleges and universities:

1. The operation of Government-owned research laboratories or centers.
2. The performance of basic research.
3. The provision of specialized education and training programs.
4. The operation of educational assistance and development programs in cooperation with other countries.
5. The provision of programs for the inservice training of Federal employees, both civilian and military, in the United States and abroad.
6. The advisory service of faculty experts on Government programs and operation.
7. The provision of special educational services for students, faculty members, and other visitors from other countries, in support of U.S. foreign policy.

General Obervations

- More than 15 different Federal departments and agencies conduct major programs in higher education, under several different legislative and executive directives. There is no single coordinating agency for the many Federal programs in higher education.
- The relationship of the Federal Government to institutions of higher education falls into two major patterns: (*a*) Federal-State cooperation, as exemplified by the land-grant college aid to "agriculture and the mechanical arts"; and (*b*) Federal-institutional cooperation, in which both public and private institutions have contracts, loans, and grants for research, services, facilities, and training.

- Federal programs are administered with the advice of hundreds of specialists drawn from colleges and universities to serve on advisory panels or committees.

- No Federal program provides general unrestricted aid to institutions of higher education. Federal programs are usually designed to further advances in agriculture, science, health, or foreign affairs; to provide for common defense; or to give financial assistance to students, rather than to assist educational institutions as such.

- Federal programs emphasize research and graduate education. Between 1955 and 1960, about 75 percent of all Federal income reported by colleges and universities was for research and development.

- Funds for each type of Federal activity in education are largely concentrated within 100 institutions. For example, 100 institutions in 1959 received more than 93 percent of the funds for research programs, graduate fellowships, and grants for facilities and equipment; 100 institutions received 88 percent of the funds in the "education and training" category.

- There are few federally sponsored programs in which most of the Nation's accredited colleges and universities (approximately 2,000 in 1959) participate. One of these, the NDEA student loan program in 1959, involved more than 1,400 or about 70 percent of the institutions. Another, the program of loans for construction of student housing and other nonacademic facilities for students has involved more than 600 institutions. However, the number of colleges and universities participating in research programs in 1959 was less than 500, and the same was true of institutional participation in education and training programs. Fewer than 300 institutions received assistance in the form of loans or grants for the construction of research facilities, for specialized equipment, or for Federal surplus real property. (Not all accredited institutions of higher education in the Nation are able to participate in many of the Federal programs. For example, only the approximately 200 institutions which offer the doctorate have the resources for extensive research.)

- Participation in Federal programs classified as research or education and training is related to the level of the degrees that the institutions award. Of the 2- or 3-year colleges that offer less than a bachelor's degree, fewer than 1 percent participated in these types of programs in 1959; 25 percent of the colleges awarding the bachelor's as their highest degree participated; 47 percent of the institutions awarding the master's as their highest degree; and 95 percent of those awarding doctoral degrees.

• Public and private institutions participate almost equally in Federal programs in higher education. The 100 major participants, as measured by total Federal income in 1960, included 54 public and 46 private institutions.

• Based on amounts of Federal income during fiscal year 1960, the following institutions were the major recipients of Federal funds.

Range of Federal Income for 100 Institutions of Higher Education, Fiscal Year 1960
(Including funds for Government-owned research centers)

1st Quartile
$5.8–$191.0 million[1]

University of California (all branches)	University of Minnesota
California Institute of Technology	New York University
University of Chicago	University of Pennsylvania
Columbia University	Pennsylvania State University
Cornell University	University of Pittsburgh
Harvard University	Princeton University
University of Illinois	University of Rochester
Iowa State University	Stanford University
Johns Hopkins University	University of Texas
Massachusetts Institute of Technology	University of Southern California
University of Michigan	University of Washington (Seattle)
Michigan State University	University of Wisconsin
	Yale University

2d Quartile
$3.2–$5.7 million

Auburn University	North Carolina State University
University of Arizona	Northwestern University
University of Arkansas	Ohio State University
University of Colorado	Oklahoma State University
Duke University	Purdue University
University of Florida	Rutgers University
George Washington University	Syracuse University
Indiana University	University of Tennessee
Louisiana State University	Texas Agricultural & Mechanical College
University of Maryland	University of Utah
University of Missouri	Washington University (St. Louis)
New Mexico State University	Western Reserve University
University of North Carolina	

[1] Sixteen institutions had Federal income greater than $10 million; seven had more than $20 million; four had more than $50 million. Many of these institutions operate Government-owned research centers.

Lower Half
$1.0–$3.1 million

University of Alabama
University of Alaska
American University
Baylor University
Boston University
Brandeis University
Brown University
University of Buffalo
Carnegie Institute of Technology
University of Cincinnati
Colorado State University
Dartmouth College
University of Denver
Emory University
Florida State University
Georgetown University
Georgia Institute of Technology
University of Hawaii
Illinois Institute of Technology
University of Iowa
Jefferson Medical College
Kansas State College
University of Kansas
University of Kentucky
University of Louisville
University of Miami
Mississippi State University
University of Nebraska
New York Medical College
Northeastern University
Notre Dame University
University of Oklahoma
Oregon State College
University of Oregon
Polytechnic Institute of Brooklyn
Rensselaer Polytechnic Institute
St. Louis University
Stevens Institute of Technology
Temple University
Tufts University
University of Tulane
Vanderbilt University
University of Vermont
Medical College of Virginia
Virginia Polytechnic Institute
University of Virginia
Washington State University
Wayne State University
West Virginia University
Yeshiva University

Research and Development

Colleges and universities serve many Federal agencies as major performers of federally sponsored research. Much of this research is carried on or directed by faculty members as an integral part of the university's regular research program. Some universities also receive funds to manage and operate separately staffed and organized Federal contract research centers. In fiscal year 1960, colleges and universities received approximately $800 million for research and development, of which $334 million was for operating Government-owned research centers. (Between the years 1957 and 1960, there were 35 such centers in operation, with several universities managing more than one, and with 2 centers operated jointly by pairs of universities. In addition, there were other Federal centers or facilities managed by associations of institutions.)

Sponsoring Agencies

The seven principal sponsors of research in colleges and universities between 1955 and 1960 were the Department of Defense, the National Science Foundation, the Atomic Energy Commission, the Department of Agriculture, the National Aeronautics and Space Agency, and the Public Health Service and Office of Education within the Department of Health, Education, and Welfare. Their programs reflect the priorities of the times, with focus on national security and defense, the conquest of disease, the improvement of agriculture and agricultural industry, and, to a lesser degree, on the improvement of education.

These seven agencies contributed the following percentages of Federal research funds allocated to institutions of higher education in 1960:

Agency	*Percent of research funds*[1]
Department of Defense	39.8
Public Health Service	30.0
National Science Foundation	11.1
Atomic Energy Commission	8.0
Department of Agriculture	6.0
National Aeronautics and Space Agency	2.6
Office of Education	2.0

[1] These figures do not include funds for the operation of Government-owned research centers.

Other agencies that contribute to research include the Office of Vocational Rehabilitation, the Veterans' Administration, the Food and Drug Administration, the Tennessee Valley Authority, and constituent bureaus of the Departments of Interior, Commerce, Justice, Labor, and Treasury.

Institutional Participation

Between 1955 and 1959, the 465 institutions of higher education holding Federal research grants or contracts included 134 universities, 22 institutes of technology, 198 liberal arts colleges, 64 State colleges, 15 separate medical colleges, 11 municipal colleges, 8 junior colleges, and 13 colleges of other types. Annual amounts of contracts and grants to these institutions (taking a 5-year average) ranged from less than $5,000 to more than $28 million. (All figures exclude payments to institutions for the operation of Government-owned research centers.)

Of the 465 institutions participating in Federal research programs, 296 were private and 169 public. The division by amount of Federal funds was 61 percent to private and 39 percent to public institutions.

The magnitude of institutional participation is associated with the following factors: (*a*) presence of schools of medicine, agriculture, and/or engineering; (*b*) degree of concentration on graduate education; (*c*) quality and size of staff in fields related to Federal projects; (*d*) willingness of the individual and the institution to accept specifically designated research contracts (particularly defense related); (*e*) ability or willingness of the institution to share in the total cost of the projects; (*f*) nearness to federally owned research centers or defense installations, or to areas favorable to the performance of specified Federal missions.

Concentration of Funds in Institutions

Federal research funds are concentrated in universities. Of all funds for research in fiscal year 1960, 68 percent went to 25 universities; 82 percent went to 50; and 94 percent went to 100. Although there were 186 private liberal arts colleges and 55 State colleges participating in Federal programs of research, their share of the Federal research funds totaled 1.1 percent.

The 25 major participants in Federal research and development programs in 1960, with a range of Federal research income from $4,499,000 to $43,176,000 (not including funds for the operation of Government-owned research centers) were the following:

California Institute of Technology
University of California
University of Chicago
Columbia University
Cornell University
Duke University
Harvard University
Illinois Institute of Technology
University of Illinois
Johns Hopkins University
Massachusetts Institute of Technology
University of Michigan
University of Minnesota
New York University
Ohio State University
Pennsylvania State University
University of Pennsylvania
University of Pittsburgh
Princeton University
Stanford University
University of Texas
Washington University (St. Louis)
University of Washington (Seattle)
University of Wisconsin
Yale University

Facilities and Equipment

College Housing Loans

The Housing and Home Finance Agency makes loans to colleges and universities for constructing student and faculty housing and related facilities. From the beginning of the program in 1950 through April 1960, more than 600 institutions had received loans totaling more than $1 billion, providing campus housing for more than 260,000 students. Ninety-two percent of the amount was loaned for housing, while 8 percent was used for constructing student centers and other student service facilities.

Surplus Real Property Transfers

The Federal Government may give surplus land or buildings to institutions of higher education. During 1958–59, 140 colleges and universities received surplus property estimated to be worth $4,895,000 (acquisition value). Over the years, 300 institutions, nearly equally divided between public and private, have received some assistance in the form of surplus real property.

Grants for Facilities and Equipment

Grants for facilities and equipment are made chiefly for health research and related activities (Public Health Service); for highly specialized facilities, construction or renovation of laboratories for science instruction, and installation of laboratory equipment (National Science Foundation); and for equipment and materials for research and related instructional programs (Atomic Energy Commission and National Science Foundation). These grants are in addition to the usual provisions for the purchase of equipment and materials in connection with research contracts or grants.

Agencies authorized to make contracts for basic research with educational institutions also may transfer title to the equipment purchased with the contract funds. In fiscal year 1960, for example, the Department of Defense transferred (gave) equipment valued at slightly less than $4 million to universities in the United States.

Institutional Participation

In fiscal year 1959, 100 universities and colleges received 96 percent of the amount of all grants made for facilities and equipment. Fifty

of these had grants totaling between $100,000 and $600,000. The other 50, listed below, received considerably more.

Institutions Receiving More Than $600,000 in Federal Grants for Facilities and Equipment, Fiscal Year 1959

Between $1,250,001 and $3,500,000

Boston University
University of Buffalo
University of California
University of Chicago
Cornell University
University of Florida
Harvard University
Johns Hopkins University
University of Illinois
University of Kentucky
University of Louisville
University of Michigan
University of Minnesota
New York University
Ohio State University
University of Pennsylvania
Purdue University
Stanford University
Tulane University
University of Utah
Washington University
Wayne State University
Western Reserve University
University of Wisconsin
Yale University

Between $600,001 and $1,250,000

University of Alabama
University of Arkansas
California Institute of Technology
Chicago Medical School
University of Cincinnati
Columbia University
University of Connecticut
Dartmouth College
Duke University
Georgia University
Medical College of Georgia
University of Miami
Massachusetts Institute of Technology
University of North Carolina
University of Oklahoma
Oregon State University
University of Pittsburgh
University of Southern California
Texas Agricultural and Mechanical College
Vanderbilt University
Virginia Polytechnic Institute
University of Vermont
Wake Forest University
Washington State University
University of Washington

Education and Training

Eleven Federal agencies sponsor college or university education and training programs designed to increase the quality and quantity of highly trained manpower in specified fields, to increase the competency of the agencies' employees, or to raise the capabilities of educational institutions and programs, again in specified fields. For each of the programs in this survey, the agency or department has a formal agreement or contract with an educational institution. (Inservice education and training programs, a common feature of most Federal agencies and departments, often involve employee training at institutions of higher education, usually without formal contract with the institution. Such programs are not analyzed in this survey.)

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A description of major Federal education and training programs, by field of endeavor, follows.

Science

The National Science Foundation administers programs designed to strengthen education in the sciences in elementary and secondary schools, colleges, and universities. These programs include sponsorship at colleges and universities of subject-matter institutes for teachers of science and mathematics, summer experience in science for selected high school students, projects for the improvement of course content in science courses, and conferences on special topics in science for college and university faculty members. The institutes and conferences are held during an academic year, a summer term, or a shorter period for the inservice training of teachers. In 1959, more than 300 colleges and universities participated in at least one science education program.

The Atomic Energy Commission sponsors conferences and institutes (sometimes jointly with NSF) in nuclear science and related fields for college and university faculty members. In 1959, 22 academic institutions were hosts to AEC institutes.

(In 1959, NASA education and training programs were not yet underway.)

Health and Medicine

The Atomic Energy Commission supports conferences and institutes for college and university faculty members in health physics, industrial hygiene, and related fields.

Public Health Service programs involve grants for medical, undergraduate, graduate, and postdoctoral training may be used for personnel, equipment, stipends for trainees, or other means for improving the research training of scientists, investigators, and clinicians. In 1959, training grants were made to 147 institutions of higher education. The largest program, in number of participating institutions and volume of grants, was sponsored by the PHS National Institutes of Health.

The Public Health Service also administers grants for the support of public health training, through grants made to 11 schools of public health on a formula basis which is partly dependent upon the percentage of federally sponsored students in each institution.

Vocational Rehabilitation

In 1959–60, the Office of Vocational Rehabilitation made grants to 95 colleges and universities to share the cost of training programs for personnel in the field of rehabilitation for the physically handicapped.

Guidance and Counseling

Guidance and counseling institutes for improving the professional qualifications of high school counselors are supported by the Office of Education. In 1960, 88 institutions conducted 103 such institutes.

Foreign Languages

The Office of Education sponsors language institutes for teachers to improve language proficiency and to introduce new methods of language teaching for elementary and secondary schools (42 institutions and 2,000 enrollees were participating by 1960). The Office also shares in the cost of language and area study centers for improvement of instruction in "critical" languages and broad foreign area competency (46 institutions had such centers by 1960).

Armed Forces

In addition to the Army, Navy, and Air Force Academies, the Department of Defense supports a variety of education and training programs in colleges and universities throughout the United States. The most widely known of these is Reserve Officers Training, used for the on-campus, preservice education of Army, Navy, and Air Force officers. In this type of program, the armed services provide the instructional staff, supplies, and equipment, and give subsistence allowances to third- and fourth-year students in the programs. In 1959, 304 institutions had ROTC programs, with an enrollment of approximately 38,000 students.

A "regular" Navy Reserve officers training program (the "Holloway plan" for officer procurement) provides subsidies for a 4-year college education at 53 civilian institutions which operate Naval Reserve Officer Training Corps programs. Upon graduation, students are commissioned in the Regular Navy or Marine Corps. In October 1959, there were 5,510 students participating.

The Navy also operates an officer procurement plan that subsidizes the civilian education of physicians, dentists, and nurses. Obligation of a stipulated period of military service accompanies this assistance.

General Education for Military Personnel

The Department of Defense provides off-duty educational opportunities for members of the armed services. Five institutions have contracts for the operation of educational centers on military bases in foreign countries. In the continental United States there are more than 100 institutions that offer on-base and on-campus courses. The U.S. Armed Forces Institute provides correspondence study opportunities to American military personnel through which 40 institutions offer high school and college courses.

Merchant Marine

The Department of Commerce provides training vessels, maintenance funds, and student subsidies for the State maritime schools in California, Maine, Massachusetts, and New York. Students who qualify as merchant marine cadets at the schools are eligible for commissions as Naval Reserve officers.

Agriculture and Mechanical Arts

The Department of Agriculture administers one of the largest Federal programs of education and training through the Cooperative Extension Service under the direction of the land-grant colleges and universities. The objective of this program is to improve agricultural production, marketing efficiency, and rural living. Over $64 million was obligated in fiscal year 1960 for extension services of this nature.

The Office of Education makes appropriations to land-grant colleges and universities for the operation of the century-old program of education in agriculture and the mechanical arts. In 1959–60, approximately $5.5 million was disbursed by the Office of Education for this program.

Grants-in-Aid to States

Federal agencies administer a variety of grants-in-aid to the States, some funds of which are channeled into higher education. A complete tracing of amounts of Federal grants-in-aid funds which reach institutions of higher education indirectly, through divisions of State government or other sources, was not undertaken in this survey.

Institutional Participation

In 1959, nearly 450 colleges and universities participated in one or more of the education and training programs described. The National

Science Foundation had programs in 387 institutions; the National Institutes of Health, in 147; and the Office of Education, in 122.

The distribution of funds is somewhat more widespread for federally sponsored education and training programs than for research. Eighty-four percent of the total Federal outlay for education and training went to 101 institutions, whereas 94 percent of the research outlay went to 100 institutions.

The following 25 institutions received 44 percent of Federal funds for education and training in fiscal year 1959, with a range from approximately $1.9 million to $5.2 million:

- Alabama Polytechnic Institute
- University of Arkansas
- University of California
- Columbia University
- Cornell University
- University of Georgia
- Harvard University
- University of Illinois
- University of Kentucky
- Louisiana State University
- Massachusetts Institute of Technology
- Michigan State University
- University of Michigan
- University of Minnesota
- Mississippi State University
- University of Missouri
- Ohio State University
- Oklahoma State University
- Pennsylvania State University
- Purdue University
- State College of Agriculture and Engineering (Raleigh, N.C.)
- University of Tennessee
- Texas Agricultural and Mechancial College
- University of Wisconsin
- Yale University

There were approximately twice as many public institutions as private ones in the group of 101 major participants in education and training programs. This predominance of public universities follows from the fact that programs in agriculture account for a large proportion of total education and training funds and are primarily located in land-grant institutions, which generally are State operated.

Eighty-eight State and municipal colleges participated in one or more federally sponsored education and training programs in 1959. Their programs were mainly sponsored by the National Science Foundation and the Office of Vocational Rehabilitation. The leading 25 recipients from this group received Federal funds ranging from $70,000 to $453,000.

One hundred sixty-eight private liberal arts colleges participated in one or more education and training programs in 1959–60. The National Science Foundation was the prime sponsor; the National Institutes of Health (PHS), second. The range of Federal funds going to the 25 leading recipients was from $60,000 to $196,000.

Not included in the above groupings are colleges attended predominantly by Negroes. Thirty of 83 colleges of this type participated in federally sponsored education and training programs in 1959–60, 18 of them public and 12 private. The 30 received approximately

$1.8 million, 55 percent of which went to public institutions and 45 percent to private. The range was from $6,000 to $319,000; seven institutions received more than $100,000. The private colleges received their funds primarily in connection with institute programs of the National Science Foundation; the public colleges primarily through land-grant appropriations.

Financial Assistance to Individuals

Federal departments and agencies offer a variety of financial aids to individuals in institutions of higher education. They include an undergraduate and a graduate loan program; subsidies for veterans; fellowships and traineeships at the graduate and postdoctoral levels; subsidies to stimulate military officer procurement; special forms of assistance such as that for American Indian teacher training, for war orphans, for professional and scientific workers, and for teachers and students from other nations. The amounts of assistance differ greatly among the programs, as do the qualifications for award.

In certain programs, the Federal agency provides assistance for study in specified fields; in others, most notably in the loan program of the National Defense Education Act and in the veterans' educational benefits, the recipient may study in any field. In some instances, Federal agencies make awards directly to recipients; in others, to the colleges and universities, which in turn select the recipients.

Loans

Loans are available to college and university students through institutions which participate in the program under the National Defense Education Act. Funds are allocated to colleges and universities (no one institution may have more than $250,000 in a single year) which then carry the responsibility for selecting recipients, distributing funds, and collecting payments. Participating institutions are directed to give special consideration to superior students who wish to teach in elementary or secondary schools or who have special capacity or preparation in science, mathematics, engineering, or modern foreign language. (For those graduates who teach in public elementary or secondary schools, up to half the loan may be "forgiven.")

Approximately 1,400 (70 percent) of the Nation's institutions of higher education were participants in the student loan program in 1959; by June 1960, an estimated 115,450 students had received Federal loans, averaging $480.00. By that date, 96 percent of the Nation's

public universities and State and municipal colleges were participating in the program, the proportion of private universities and liberal arts colleges being almost equal.

Fellowships and Traineeships

Purpose.—Federal fellowships are used (*a*) to assist in the recruitment and advanced training of scientists, doctors, nurses, engineers, public health personnel, linguists, and other specialists, including college and university teachers; and (*b*) to enable trained individuals to update or increase their skills, knowledge, and general competence in their respective fields.

Agencies.—Federal agencies offering fellowships in 1959 were the National Science Foundation, the Atomic Energy Commission, the Office of Education, the Office of Vocational Rehabilitation, and the Public Health Service (through both the National Institutes of Health and the Division of Nursing). There were also grants awarded through the Department of State for graduate study and research abroad.

Number.—In 1959, nearly 10,000 traineeships and fellowships were awarded (excluding the Department of State grants), of which 4,883 were graduate awards ranging in amount from $1,800 to $2,500 each and 1,361 were postdoctoral fellowships ranging in amount from $4,500 to $12,000 (mainly determined by salary-matching arrangements, the highest amounts going to career scientists). There were also 3,703 traineeships in fields of health and vocational rehabilitation, of which approximately 525 were for prebaccalaureate nurse training. Approximately 70 percent of all Federal graduate fellowships were awarded in the sciences. Fifty-six percent of the 1,000 graduate fellowships awarded under the National Defense Education Act were in the humanities, the social sciences, and education.

Participating institutions.—In 1959, awards at the graduate and professional levels of training from any one sponsoring agency went to full-time students at fewer than 125 colleges and universities. Of the 100 institutions having the largest numbers of graduate fellows, 58 were publicly and 42 privately controlled. These 100 institutions were attended by 95 percent of all the graduate fellows. Fifty of these colleges and universities had 79 percent of all fellows and 25 had 62 percent.

One of the objectives of the National Defense Education Act is the creation and support of new graduate programs. Distribution of NDEA fellows is therefore less concentrated than that for all fellows. In this program in 1959, 90 percent of the fellows attended 100 institutions, 55 percent attended 50, and 35 percent attended 25 institutions. The concentration of students in all Federal graduate programs is

attributed to the fact that most fellowships are awarded to persons preparing for Ph. D. degrees; in 1959, there were approximately 200 institutions conferring doctorates.

Part-time or short-term awards.—These agencies in 1959 made such awards in their respective interests to the following numbers of students: National Science Foundation—1,191; National Institutes of Health—1,036; Office of Vocational Rehabilitation—2,464.

Research and Project Assistantships

Federally sponsored research programs provide opportunities for employment through research assistantships, in many cases the only means by which students are financially able to obtain graduate or professional training. The number of research or project assistantships (an estimated 20,000–30,000 in 1959) exceeds the number of Federal fellowships. The stipend varies with the institution but usually is comparable to a fellowship.

Stipends for Teacher Training

Special stipends awarded through selected institutions (individuals chosen by the institutions) in 1959–60 numbered 31,440 for attendance at National Science Foundation institutes and training programs for college, high school, and elementary school teachers of science and mathematics. The Office of Education, under terms of the National Defense Education Act, awarded 2,013 stipends in 1960 to foreign language teachers, enabling them to attend language institutes, and 3,356 stipends to counseling and guidance specialists in the same year. The Atomic Energy Commission also sponsored summer institutes at faculty level for specialized training in nuclear science, health physics, industrial hygiene, and related fields.

Special Student Aid

Veterans benefits.—In the fall of 1959, more than 275,000 students were attending colleges and universities with assistance from readjustment training programs authorized under the GI bills and under vocational rehabilitation programs. In the 1959 fiscal year, more than $8.8 million was spent on vocation rehabilitation, and more than $347 million was provided for veterans education and training at the higher education level.

War orphans assistance.—In the fall of 1959 more than 7,500 students were attending colleges and universities under legislative provisions for educational assistance to orphans of veterans of the Spanish-American War, World Wars I and II, or the Korean conflict. This program provides payments to the recipients from which they pay tuition and other educational costs at the institutions they attend.

Undergraduate research.—In 1960 there were 3,338 undergraduate students able to gain special experience in scientific research with the help of National Science Foundation stipends.

Indian education.—The Department of the Interior, Bureau of Indian Affairs, made 612 grants, totaling $231,000, to American Indian college students in 1960.

Military Officer procurement.—The Navy's Holloway plan is an officer procurement program which subsidizes a 4-year college education at civilian institutions which operate Naval Reserve Officer training programs. Graduates are commissioned in the Regular Navy or the Marine Corps for a stipulated term of active service. In October 1959, there were 5,510 students participating in the Holloway plan.

Another officer-procurement program involves students in schools of dentistry, medicine, and nursing. In 1959, 800 students participated in this program.

ROTC programs for the U.S. Air Force, Army, and Navy offer college students the opportunity to acquire a reserve officer commission. Supplies and equipment are provided and subsistence allowances awarded to third- and fourth-year students. In 1959, approximately 38,000 students in 304 institutions participated in ROTC programs.

International Education

International activities in higher education include the full or partial subsidization of American students abroad; assistance to foreign students, teachers, and specialists studying in the United States; sponsorship of educational projects abroad; and exchanges of persons and information for the purpose of advancing the technological development of participating foreign countries.

Funds are made available for some programs by annual congressional appropriation and in some instances are derived from counterpart funds (certain foreign currencies accumulated from the sale of U.S. surpluses abroad) which the Congress has authorized to be used for educational purposes.

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Educational and Cultural Exchange

This program, administered by the Department of State, provides grants to Americans for study, teaching, lecturing, advanced research, and other related activities to be carried on abroad and grants to foreign nationals to visit the United States for similar purposes.

In 1960, exchanges took place between the United States and other American Republics, countries of the Near East, South Asia, the Far East, Africa, and Europe. Areas of activity included graduate study, postdoctoral research, university lecturing, teaching or teacher training, public lecturing, observation and practical experiences in educational and cultural fields, consultative services, and educational travel. This involved the exchange of 7,234 persons—2,061 Americans sent abroad (from 431 different institutions) and 5,173 foreign visitors brought to the United States (to attend 353 different institutions).

The following institutions were the major participants (measured by the number of persons involved) in educational and cultural exchange programs in 1960.

University of California
University of Chicago
University of Colorado
Columbia University
Cornell University
Harvard University
University of Illinois
Indiana University
University of Kansas
Massachusetts Institute of Technology
University of Michigan
University of Minnesota
New York University
Northwestern University
Ohio State University
Oregon State University
Pennsylvania State University
University of Pennsylvania
Princeton University
Purdue University
Stanford University
Syracuse University
University of Texas
University of Wisconsin
Yale University

Education for Economic and Social Development

The Federal Government enters into contracts with institutions of higher education to provide counsel and personnel to the governments of other countries in developing the economic and social life of their peoples and in improving their educational institutions. In the underdeveloped areas, heavy emphasis is placed upon the professional training of native teachers and administrators and upon the training of technicians and managerial personnel to meet labor, agricultural, and industrial needs.

Fields of activity include English language instruction, public administration, public health, business administration, agriculture, home

economics, economics, labor affairs, industrial training, mining and minerals, textile engineering, medical education, nursing, mechanics, and fisheries.

In dollar volume, the technical assistance program is the major Federal international education program. In 1960, 68 U.S. colleges and universities had 95 contracts with the International Cooperation Administration, involving 34 countries. The total "face value" of these contracts, including prior and future-year commitments, was approximately $94 million.

The institutions having contracts with the largest dollar volume, from $1.5 to $7.8 million, for a total of nearly $62 million:

University of California
Columbia Teachers College
University of Illinois
Indiana University
University of Kentucky
University of Michigan
Michigan State University
University of Minnesota
University of Nebraska
Ohio State University
Oklahoma State University of Agriculture and Applied Science
University of Southern California
Stanford University
University of Tennessee
Texas Agricultural and Mechanical College
Washington State University
University of Wyoming

Another aspect of the program involves bringing foreign nationals to the United States for specialized education, training, inservice training, and observation of American methods and techniques. In the fiscal year 1960 there were 6,789 such trainees who came to the United States from Africa, Europe, the Far East, Latin America, and the Near East, as follows:

Field	*Number of trainees*	*Field*	*Number of trainees*
Agriculture	1,141	Industry	1,577
Atomic energy	205	Labor	680
Commercial development	60	Public administration	401
Education	1,138	Public safety	323
Health	428	Social welfare	7
Housing	66	Other	249

At least 25 percent of the total, it is estimated, spent the principal portion of their time at educational institutions. Many of the others attended colleges and universities for refresher courses, seminars, or other short-term studies.

A third part of the program for economic and social development involves service-type contracts with American institutions of higher education to provide: (*a*) special training for Americans about to go abroad for ICA project assignments, (*b*) English-language brushup for groups of foreign trainees arriving for study, or (*c*) special

courses in certain areas of study for groups of foreign nationals from a number of countries.

Other Programs

The National Institutes of Health in 1960 awarded postdoctoral research fellowships to 68 persons from 41 countries for work on research projects in medical and biological laboratories in the United States. The National Science Foundation has programs for the support of foreign scientists for short-term lecture visits and for participation in summer and academic year institutes. The Foundation also offers fellowships and travel support to Americans for study and conferences abroad. The U.S. Information Agency assists colleges and universities to establish affiliations with institutions in other countries. In 1960, more than 50 institutions participated in the USIA program.

PART II

Effects of Federal Programs on Higher Education

Introduction

This part of the report is based upon a study by the Brookings Institution performed under contract with the U.S. Office of Education and directed by Dr. Harold Orlans.

The Brookings study was addressed to three questions:

1. *Effect on quality.*—"What have been the effects of Federal programs on the quality of higher education, particularly at the undergraduate level?"
2. *Concentration of Federal funds.*—"To what extent can or should fuller use be made of institutions not heavily involved in present Federal programs?"
3. *Reaction to administration of Federal programs.*—"What has been the experience of institutions with the administration of Federal programs?"

This was a comparative study of three groups of institutions and three fields of liberal arts disciplines chosen for their importance and the range of educational situations exemplified, not for their statistical representativeness. Data were gathered through about 400 interviews and a questionnaire completed by some 3,500 full-time faculty members. Statistical information came from the institutions, private agencies, and the Federal Government. The inquiry was not designed primarily as a questionnaire survey; the campus visits, interviews, and the analysis of other data concerning the institutions were weighted just as heavily as the survey data collected from the faculty.

The inquiry focused on these 36 institutions:

Group I.—Twelve universities selected from those well-known internationally, nationally, or regionally, none having an enrollment of fewer than 3,500 students and each receiving at least $4 million in Federal funds during the academic year 1957–58.

Group II.—Twelve universities chosen from among 54 receiving $0.5 to $1.9 million in Federal funds in 1957–58. (A number of institutions in group II were chosen because they have a large body of graduate students, have awarded a large number of science doctorates, are members of the Association of American Universities, or have a school of medicine or engineering. Inquiry was directed to learn why such statistically "strong" institutions do not, in fact, receive greater amounts of Federal funds.)

Group III.—Twelve liberal arts colleges, six of extremely high standing in education circles and many of whose graduates have obtained doctorates at other institutions; and six of good repute but less stature. All are either coeducational or all-male colleges. These 12 colleges had a combined Federal income in 1957–58 of an estimated $0.3+ million.

All institutions participating in this study did so anonymously.

Several factors governed the choice of fields for study. Professional schools (agriculture, business, education, engineering, medicine, etc.) were excluded. The desirability of maintaining comparability between the faculty at universities and colleges further restricted the range of departments from which the survey population could be drawn. The liberal arts disciplines selected were: the sciences (including chemistry, mathematics, physics, and biological fields); the social sciences (economics, political science and government, psychology, sociology, and anthropology); and the humanities (classics, English, history, modern foreign languages, and philosophy).

This report follows the Brookings Institution study in topical treatment and bears substantial similarity to it. The present author has integrated the information provided by the study with the purpose and content of this survey. The viewpoints or judgments expressed in part II, therefore, are not attributable to the Brookings study except where quoted directly or indirectly. It is to be understood that any viewpoints or conclusions attributed to the Brookings Institution study are those of its author, and do not necessarily reflect the views of other members of the Brookings staff or of the administrative officers of the Institution.

The Brookings study presents a great deal of evidence on general trends in faculty and student quality, teaching load, etc. This brief summary of it only condenses its findings on specific kinds of Federal influence on colleges and universities. Examination of the complete Brookings report is essential for an understanding of general trends and the complex relationship of Federal influence to them. That report will be published by the Institution in the fall of 1962.

Effect on Quality

Response to the first of the three questions—"What have been the effects of Federal programs upon the quality of higher education, particularly at the undergraduate level?"—is the most difficult. It is not always possible to separate the effects of Federal programs from those of other programs. Furthermore, it is most difficult to describe effects on quality by quantitative measures. However, certain factors can be isolated and examined, and therefore the study presents evidence of Federal effects on these factors: faculty quality, student

quality, faculty-student contacts, teaching assistantships, research associates, balance in the educational programs, teaching load, and faculty income.

Faculty Quality

To test opinion about the effect of Federal activity on their educational programs, faculty members of the three groups of institutions were asked this question: "What has been the overall effect of Federal programs on the ability of your department to attract and hold the best faculty?" The response by institution groups is indicated in table 1.

The response when analyzed by field of instruction clearly reflects the importance of help given by Federal programs. Of the scientists, 76 percent in group I, 70 percent in group II, and 52 percent in group III responded "Helped us." In each of the groups, approximately 80 percent of the faculty members in the humanities, however, responded that there has been "No visible effect."

Only a small number of faculty members in any of the three fields—science, social science, or the humanities—attribute staffing difficulties to the presence of federally sponsored programs. The greater the volume of Federal activity, the stronger the vote that Federal programs have "helped."

There is no strong evidence that the quality of the faculties within any of the groups of institutions studied has suffered as a result of federally sponsored programs. On the contrary, Federal programs are reported to have improved the faculty. (In general, faculty members in all fields and in all three groups of institutions believe that the quality of their new faculty members is improving. The similarity in response, by group or by field of study, is striking.) Never-

Table 1.—*Effect of Federal programs in attracting and holding the best faculty, as reported by faculty members*

Faculty response	Percent of faculty reporting, by group		
	I	II	III
TOTAL	100	100	100
Helped us	54	53	30
Had no visible effect	42	44	68
Handicapped us	4	3	2

theless, the staffing problem of some universities and many undergraduate colleges that have relatively small resources is expected to become increasingly severe as these institutions try to compete with stronger institutions for well-qualified faculty in all fields. Current Federal programs seem to have increased the difficulties of the weaker institutions in this competition.

Student Quality

To determine whether federally sponsored programs had influenced the quality of students enrolling in the three groups of schools, or in certain fields of study within each, faculty members were asked: "What has been the effect of Federal programs on the ability of your department to attract and hold the best students?"

The response to this question is summarized in the Brookings Institution report as follows:

> More university faculty [members] in every field surveyed indicate that Federal programs have had an impact on graduate students than note an impact on undergraduates. In the natural and social sciences, over 70 percent at both groups I and II agree that Federal programs have helped their departments attract good graduate students. As we might expect, only a minority of faculty in the humanities subscribes to this position; but, as we might not expect, that minority is significantly larger at group II than at group I universities. This probably reflects the emphasis on the geographic dispersion of the National Defense Education Act programs which account for the bulk of Federal aid to the humanities. . . .
>
> Fourteen percent of the group I faculty in the humanities state that Federal programs have positively handicapped their department in attracting the best graduate students. With little doubt, many of these faculty are referring to the adverse effects which they believe certain NDEA graduate fellowships assigned to "new or expanded" programs have had upon long-established programs in the humanities.
>
> Unlike university faculty, most college faculty (including a small majority of those in science departments) state that Federal programs have had no visible effect on attracting good students to their department. The large minority of college scientists who note that Federal programs have helped their departments have presumably benefited from Federal research grants, faculty fellowships, summer institutes, student research participation awards, and other programs designed to stimulate undergraduate science.

The possibility that Federal activity may be changing the proportions of students who enter the sciences as compared with the social sciences and humanities was tested. On this point, the Brookings Institution study reports:

> Science enrollment has, of course, increased greatly over the years, as has enrollment in most fields, but relative to the number of students in the social sciences and humanities *combined* it has remained remarkably stable not only in the postwar years but since the 1920's. . . . A comparison of the immediate postwar years with earlier decades shows a marked decline in

> the proportion of bachelors degrees awarded in the humanities and a corresponding rise in the proportion awarded in the social sciences, but very little trend of any sort is detectable after 1950. At the doctoral level, the relative decline in the number of degrees awarded in the humanities and rise in the social sciences has continued since at least the late 1930's.
>
> In short, within the undergraduate liberal arts, the most remarkable relative growth in degrees awarded over the last 40 years has occurred not in the sciences but the social sciences. In doctoral studies, the sciences are in command—but they have been so [since] long before the stimulus of postwar Federal research programs, and it is the social sciences again which have made the largest relative gains in the postwar period. Apparently, therefore, these Federal programs have not—or not yet—radically altered the relative distribution of either undergraduate or graduate degrees in the major liberal arts fields. The most that can be contended is that, indirectly, they may have contributed to the long-term attrition of the humanities. . . .
>
> The main point upon which an argument about Federal funds leading the ablest students to select a particular field might hinge is the high intelligence of students in the heavily supported fields of physics and mathematics. This argument is, however, vitiated by the stability in the relative ranking of mean intelligence in different fields over periods long antedating the Federal Government's interest in the sciences.

Faculty-Student Contacts

Much debate and discussion in academic circles has centered around trends in the quality of instruction, especially in undergraduate programs. A thesis held by some is that rapid increase in enrollment, the growing prestige of research, and the spread of semiadministrative responsibilities for the management of projects (Federal and other) has lessened the interest of faculty members in their teaching responsibilities. This study sought information on a number of these points.

Personal relationships—The danger of lessened faculty-student contact has accompanied the increases in class size for all institutions. The Brookings study asked faculty members how often students come to their office "to discuss matters of concern to them."

> Replies indicate two clear progressions: 1. upperclassmen visit more often than lowerclassmen, and graduate students more often than upper classmen; 2. undergraduates in liberal arts colleges visit more often than those in universities. At the universities, faculty in the humanities are visited more frequently by undergraduates than are faculty in the sciences, while at the colleges, the reverse is true. This is consistent with the heavier teaching load of humanists at universities and scientists at colleges. The modal response of university faculty is that undergraduates visit their office "occasiónally," graduate students "often"; of college faculty, that lowerclassmen visit their office "occasionally"; upperclassmen, "often."
>
> Faculty answers to our query about student visits in their homes follow a comparable pattern: less than half of university faculty but 85 per cent of college faculty have had lowerclassmen in their homes; more have been visited by upperclassmen, and nine-tenths of university faculty have had graduate students at home.

Emphasis on research and graduate teaching.—Many circumstances contribute to decreasing interest by university faculty members in undergraduate programs and objectives, but one can hardly doubt that the condition is general. The time and interest of faculty members of universities is being increasingly absorbed in their own research and the direction of graduate studies related to research interests. Even though they realize the importance of strong undergraduate teaching, many professors do not enjoy it. Their interest in teaching undergraduate courses that aim toward the broad objectives of liberal education is typically weak. Faculty members in universities report that the man who teaches undergraduate students extensively is held in less esteem by his colleagues than the man who usually teaches graduate students. Although these conditions have not been created by federally sponsored programs, Federal (and other) programs that are expanding the dimensions of research and highly specialized training are intensifying the situation.

Some of the conditions prevailing in the colleges and universities studied follow.

Table 2.—*Desired and actual allocation of faculty time: Percent estimated by faculty members*

Function	Mean time (percent), by group					
	I		II		III	
	Desired	Actual	Desired	Actual	Desired	Actual
TOTAL	100	100	100	100	100	100
Teaching	47	52	53	61	63	76
Undergraduate	(22)	(32)	(27)	(41)	(53)	(75)
Graduate	(25)	(20)	(26)	(20)	(10)	(1)
Research	47	29	40	23	30	11
Administration	4	15	4	12	4	8
Other	2	4	3	4	3	5

Faculty members at all types of institutions and in all fields want to spend more time at research, less at teaching. Faculty members were asked, "If you were free to choose, how would you like to spend your working time?" and "How did you actually spend your working time this year?" (September 1960–spring 1961). (See table 2 for the tabulation of their response.)

The desire to be identified with research and graduate education is clear. Faculty members at group I institutions would allocate 72 percent of their time to these activities rather than the actual 49 percent

now given. For group II, the desired proportion is 66 percent in contrast to the actual 43 percent, and for the college faculty members in group III, the figures are 40 percent and 19 percent, respectively.

There is a wide variation in the amount of time given to research. More than two-thirds of all scientists in the group I universities are giving at least one-fourth of their time to research; more than half (57 percent) of the social scientists are so engaged but only one-third of the professors in the humanities. The comparable figures for group II are 54 percent, 43 percent, and 24 percent, respectively. In the colleges, group III, 18 percent of the scientists, 24 percent of the social scientists, and 11 percent of the humanists spend at least one-fourth of their time in research.

In group II, 55 percent and group III, 62 percent of the responding faculty members expressed the opinion that Federal funds should be more evenly balanced between research and teaching. Very few respondents chose the alternative of concentrating Federal funds on teaching rather than research. Large minorities in groups II and III and a majority of group I faculty members favored continuance of the present concentration on research.

Graduate Teaching Assistants

The use of teaching assistants for undergraduate courses has been increasing greatly in the last 5 years. The study found that 96 percent of the scientists, 85 percent of the social scientists, and 78 percent of the humanists in groups I and II were in departments that used graduate assistants as instructors. In group III, 63 percent of the scientists, and 20 percent of the social scientists and the humanists were in departments that had such assistants. However, the supply of well-qualified graduate students is apparently not large enough for both scientific research projects and teaching responsibilities.

The Brookings report comments:

> Altogether, the picture is not a happy one, and the chairmen of major science departments are widely agreed that, at present, it is the poorer and not the best graduate students who are likely to be teaching assistants. The best students prefer work-free fellowships or research assistantships which, while requiring work, contribute directly to their dissertation or at least a publication; the others are left to teach. Teaching is third choice partly because of lower stipends (these have generally been raised to match or occasionally exceed other awards, but government fellowships are generally financially more advantageous because of their tax-free nature, dependency allowances, and free tuition); partly because research is the going thing and more in line with the future employment of Ph. D.'s in many sciences; and because teaching delays the completion of the doctorate. In all scientific fields and in psychology the refrain is the same, but the problem is most acute at universities with the largest number of Federal fellowships and research assistantships.

> The contrast with the humanities is striking. There, teaching assistantships are at a premium and awarded to the best graduate students, and the problem experienced by university science departments does not arise.

The majority of faculty members and department heads in the sciences report, however, that the use of student assistants in laboratory work has not brought a decline in the quality of laboratory instruction. Considering the problem of placing the best students in such positions, we may infer that the quality of second (or third) best students—those now apparently performing the tasks in assistant positions—is as good as that of their predecessors.

Research is an object of compelling attraction, and Federal and other programs are feeding the research desires of faculty members and their students. In the process, programs of undergraduate education tend to be the "unfavorite child" in the family of professorial responsibilities.

Research Associates

The research associate is a relatively recent addition to the academic staff of universities. The Brookings report gives this description of the situation:

> Federal research programs have introduced into the academic community a sizable group of professional personnel who offer one way to improve the quality of education and also alleviate the reduced personal contact between students and faculty at large universities. Although they go by different names on different campuses, we will call them *research associates*. Their distinctive characteristics are a Ph. D. degree and full-time research employment, generally on a federally financed project. The institution's contractual commitment to the research associate seldom extends beyond the duration of the project, although, if his performance is satisfactory, efforts will be made to continue his employment on another project and many associates do in fact remain at the same institution for an extended period. . . .
>
> Some science professors with a large and continuing volume of research appear to be turning to research associates where they would formerly have used graduate students. From the viewpoint of a busy professor, the research associate offers a number of advantages over the graduate student: he is more mature, independent, and experienced, and his experience is not lost—it remains a cumulative asset; more responsibility can be delegated to him, he requires less instruction and supervision, and his selection and retention is more completely under the professor's control. The unfortunate feature of excessive reliance on research associates, of course, is the loss to the educational process: the loss of a position previously filled by a graduate student (basic research agencies make much, in their budget justifications, of the educational assistance rendered to graduate students through the many research assistantships provided by grants and contracts); and the loss in the student's contact with the busy professor who delegates to the research associate much of the day-to-day counseling in the lab. But, in fact, this is happening with increasing frequency: the research associate

and postdoctoral fellow play an active part in graduate science education, helping students with their research problems, advising on their theses, participating in graduate seminars. Most important of all, perhaps, simply by being *there*, available for informal bull sessions and scientific chitchat, the research associate provides the student with an invaluable bridge to the more inaccessible senior members of his profession and to the world outside. . . .

Federal research programs have brought to many university campuses a large number of postdoctoral research scientists relatively divorced from normal departmental educational functions. Their involvement in teaching has been limited by the requirements and administrative restraints of the programs, faculty opposition, and their unsatisfactory academic status (not to mention their frequent disinterest in teaching). Explicit encouragement by the Government, more favorable employment policies, and more imaginative educational methods can return to the educational community some of the talent which research programs have removed from it.

Balance in the Educational Program

Faculty members were asked, "Since and including last summer, has any of your research, teaching, study, or consulting been financed by the Federal Government?" Affirmative replies have been tabulated in table 3.

Table 3.—*Percent of faculty members having any research, teaching, or study financed by the Federal Government, summer 1960 or academic year 1960–61*

Field	Percent of faculty, by group		
	I	II	III
All fields	48	41	22
Sciences	78	71	51
Social sciences	39	38	18
Humanities	9	7	2

The great difference in the support of scientists and humanists is obvious from the table. Whether the concentration of funds in science is in the national interest is another question. Faculty opinion on that score is reflected in the following comment from the Brookings study:

> A small majority of scientists believe that the concentration of Federal funds in the natural sciences and relative neglect of the humanities is in the present national interest, but over two-thirds of the social scientists and a still larger proportion of humanists affirm that it is not. Some 70 percent of the scientists, however, state that the present pattern is neither in the

long-run national interest nor in the best interest of their institution, and nine-tenths or more of their colleagues in the social sciences and humanities agree.

Asked further, "If you could redistribute the Federal funds presently available, what would you do?," over 70 percent of respondents at all three groups of institutions indicate that they would "Give the humanities somewhat more and the sciences somewhat less, but still the major portion." It is worthy of special note that 67 percent of the *scientists* at the group I universities now receiving the largest sums from the Federal Government also subscribe to this position, and the comments of many suggest that an even larger proportion would favor a policy which gave *both* humanists and scientists more money or at any rate did not penalize the sciences in order to help the humanities.

The difference of concentration in funds between fields of study is not the only point of Federal impact. Within the fields being heavily supported, there are priorities and preferences which disturb those less favored. Engineers, for example, complain that projects in basic engineering sciences are shunted to physicists. Scientists report that they find it possible to get support for projects in certain specialized fields and not in others, or only in directing research toward certain ends. In general, however, scientists do not report discontent with Federal programs; rather they are pleased by the opening up of research opportunities in a variety and on a scale that they had never experienced nor expected.

Within the social sciences, Federal activity is most pronounced in the fields of psychology, sociology, and economics. Among departments of psychology the proportion of faculty members engaged in Federal programs resembles that in the natural sciences. The almost exclusive support for work on problems which yield to quantitative techniques is reported by social scientists as a limiting factor in the broad advance of research in the social sciences.

One of the most significant concomitants of Federal activity is seen in the change of content in certain disciplines; i.e., the change in physics through developments in nuclear energy. Evaluation of these effects is not undertaken in this study.

Teaching Load and Faculty Income

Conditions of teaching load and income are affecting the status and morale of faculty members in the institutions of higher education. Differences in the working conditions of faculty in the three fields—sciences, social sciences, humanities—are of particular interest to this study.

Teaching load.—To the question "How many classroom hours per week do *you* teach, on the average?" the mean response of faculty members at group I institutions was 6.8; at group II, 8.6; and at group

III, 11.5. Science professors in groups I and II reported a class-hour teaching load of 6.0 and 8.1, respectively, while the humanities professors in these groups report 8.3 and 9.9. Scientists in undergraduate colleges (group III) report 12.7 hours, the largest classroom teaching load of any group or teaching field. (Humanists in group III report 11.2.) Science departments in the colleges usually must staff their courses almost entirely from full-time faculty members; they do not have the relief which the presence and preparation of graduate students makes possible. Social scientists report a mean of 6.4 hours in group I, 7.9 in group II, and 10.1 in group III.

The number of classroom hours per week is of course not a measure of the total teaching load of a professor. Such an index does not include the considerable time he spends in preparing for teaching, reading papers, counseling students, and in performing other duties related to classroom teaching. These related duties, while usually proportional to the hours taught, vary according to field and level of study. Hence, the number of classroom hours is typically used for comparative purposes. The total workload would include a professor's research and service activities both in and out of his institution.

Faculty income.—Asked, "Was any of your regular salary *during the academic year* (1960–61) drawn from Federal funds?" faculty members responded *yes* in these percentages: Group I, 15.6; group II, 11.2; group III, 3.2. In group I, the salaries of 24.6 percent of the responding scientists were paid in part from Federal funds, and 14 percent received more than half their salary from such funds. (Federal funds in a sense are used to compensate the institution for the time it releases the faculty member to work on a Federal project.)

Although basic salary schedules remain roughly equivalent, federally sponsored programs (and other programs financed from outside sources) do bring certain benefits and advantages to the faculty members who participate in them. These benefits include: (*a*) opportunities to supplement their salaries—e.g. through summer research; (*b*) funds to employ technical and clerical assistance; (*c*) greater opportunities for travel (related to their projects); and (*d*) the prestige and satisfaction of having their activity—e.g., research—nationally recognized and rewarded.

The Brookings study comments:

> Just as Federal stipends have raised the average income of graduate science students above that of students in the humanities, so Federal research funds have raised the average yearly income of science faculty above that of faculty in the humanities. Universities have managed to maintain a surprising degree of comparability between the academic year salaries of scientists and humanists (although, even where these are identical, scientists still earn more than humanists by a given age, as they are several years younger at most ranks). But universities have been unable

to match the supplemental income received by some scientists from Government research programs during the academic year and by most scientists from the same source during the summer months. Additional income which many scientists receive from Government and other consulting (and, in all likelihood, from their greater investments in science-based industry and business) enlarges the difference between the average yearly income of the two groups. Varied lines of evidence suggest that the added income university social scientists derive from Government sources falls in between that received by scientists and humanists, upon whom our discussion has focused.

Summary

The impact of Federal activity is summed up this way in the Brookings report:

> The effects which Federal programs have had on the quality and nature of higher education have been varied and uneven: pronounced in some areas but virtually undetectable in others where one would expect a marked effect. On the whole the effects have been decidedly good.
>
> They have been most striking and direct in scientific research and education at a few leading graduate and professional schools and institutes of technology, and most imperceptible and indirect in scholarly work and teaching in the arts and humanities at 4- and 2-year liberal arts colleges. We have not explored either the tenuous effects at the latter institutions or the pronounced effects at professional schools of medicine, engineering, and agriculture, but have focused on the impact on liberal arts education at a broad group of public and private universities and a select group of private colleges.
>
> Federal programs have aided these institutions to improve the quality, increase the numbers, improve the salaries, and reduce the teaching loads of their faculty in the sciences and some social sciences. They have also served to concentrate the number of scientists at leading universities, and one may infer that this has aggravated the difficulties which small colleges are experiencing in attracting new Ph. D.'s in the sciences to their staffs.
>
> Surprisingly, there is no sign that the large sums which the Government has invested in the sciences have yet led, nationally, to an increase in the proportion of faculty or students in the sciences, or to an undue concentration of the ablest minds in these fields. However, there are signs of a heavy concentration of the best students at a few famous private universities.
>
> By greatly advancing knowledge in the sciences and in some aspects of the social sciences, Federal research programs have greatly improved the content of instruction in these fields. But indirectly, they have had other, less favorable effects, particularly on undergraduate science education. Their emphasis on research has accelerated the longstanding depreciation of undergraduate education at large universities and the reduction of personal contacts between lower classmen and faculty heavily engaged in research. And the numerous attractive stipends that Federal research and fellowship programs offer have left only the poorer graduate students to instruct undergraduate laboratory and other science sections.
>
> Perhaps the most unfortunate consequence of Federal science programs has been the cleavage they have engendered between the status and rewards

of faculty in the sciences and humanities. Surely this is the major problem posed for educational institutions by the unbalanced nature of present Federal policies and expenditures, and it suggests the desirability of either counterbalancing programs in the humanities or of broader forms of institutional aid.

Concentration of Federal Funds

The question of the concentration of funds may be attacked more easily with quantitative evaluation than the first question on qualitative effects. But there is a great gap between the description of expenditure figures and the decision as to whether funds are or are not properly concentrated. To frame these decisions this section offers evidence of the actual concentration of funds, a comparison of group I and group II institutions, and faculty opinion on the concentration of funds.

Present Concentration of Funds

Since Federal funds are concentrated on research programs, they are centered in fewer than 200 institutions. In fiscal year 1960, 60 percent of the Department of Defense research funds went to 20 institutions; 78 percent of National Science Foundation funds for research laboratories and facilities went to 20 schools; 88 percent of National Aeronautics and Space Administration research was directed to 20 institutions. Yet, in spite of this concentration, there are indications that research funds are more widely dispersed than in 1952 or 1954. From 1954 to 1958, the percentage of total Federal research and development funds in the 20 leading recipient institutions dropped from 66 to 54. From 1952 to 1960, the number of institutions receiving research and development funds from one or more Federal agencies increased from 225 to 450.

Larger budgets, the broadening size of programs, the drive of all agencies for the "best man," legislation directed toward expanding the number of centers of federally sponsored activity (NDEA title IV graduate fellowships, for example) and other influences are tending to broaden the band of university participants in research as well as other programs.

Comparison of Group I and Group II Institutions

Characteristics that might significantly differentiate the institutions heavily involved in Federal activity from those less involved were

examined with the intent of determining what factors tend to attract large Federal spending. This inquiry involves primarily a comparison of the two groups of universities.

Students.—Group I institutions attract the "best" students as identified by scholastic aptitude measurements and in turn have larger proportions of the National Merit Scholars. Their output of Ph. D. graduates, National Science fellows, and Woodrow Wilson fellows is also proportionally greater.

Comparisons were also made of graduate students only. In general, the graduate students in group I institutions prove superior to those in group II institutions on all indexes.

Faculty.—Faculties also differ in excellence, the more distinguished, as evidenced by certain indexes, being concentrated in group I institutions. The ratio of faculty scientists in group I to those in group II is 3.2 to 1, yet the group I to group II ratio of Nobel Prize winners as of February 1961 is 7.5 to 1 and of members in the National Academy of Sciences is 18.6 to 1. The group I to group II faculty ratio in 13 basic fields of instruction is 1.7 to 1, yet the ratio of Guggenheim fellows is 6.3 to 1 and of former Woodrow Wilson fellows, 6.6 to 1.

Department ratings.—Judgments of scholars in several pertinent fields of study were used to compare the groups of institutions. One check was made against the ratings of department chairmen who participated in Hayward Keniston's nationwide study. (See "Bibliography.") In this study department chairmen of leading universities named the 15 graduate departments that they considered the strongest in the Nation. In these ratings at least 4 of the group I institutions were among the 10 institutions ranked as the best in each of 6 major areas of science. None of the group II institutions ranked this high. In the social sciences (4 major areas) and in the humanities (6 major areas), the department chairmen named an average of 4.1 group I institutions and 0.3 group II institutions among those 10 having the strongest department for each area.

Faculty members in groups I and II confirm the finding of the department chairman in the Keniston study. They consider the departments in group I institutions to be on the whole stronger than departments in group II institutions. It is interesting that each group tends to rate itself higher than outsiders do.

A third check was made by asking the chairmen of departments in group I and group II institutions to name the 12 best departments in their fields among the 24 universities included in this study. Group I institutions had an overwhelming number of the departments that were rated best.

Research.—Separate consideration was given to factors associated with a high volume of federally sponsored research in these groups of institutions. The difference in volume of research funds (Federal and other) between group I and group II institutions has been long standing. An estimate of research expenditures in the two groups of institutions in prewar years, 1937–38, shows that group I institutions were well ahead of those in group II. This information points to the fact that when Federal agencies and departments placed their recently stepped-up programs of research, they sought first people in the places where research activity was going on.

The conditions which make for a large volume of research are not mysterious: good salaries to attract good people, low teaching loads, some money with which to get started, space in which to work, and equipment with which to work. In all of these respects, group I institutions are generally superior to group II.

Evidence has not been developed to show whether federally sponsored activity is responsible for contributing the strength needed to raise the relative rank of an institution. The comparisons would suggest that group I institutions have been topflight for some time. Federal programs have built strength differentially among the schools, perhaps increasing the gap between group II institutions and those in group I, although at the same time they have probably produced the greatest proportional gains in some group II institutions.

Faculty Opinions on Dispersal of Federal Funds

Scientists in each group of institutions were asked their opinions on the current concentration of Federal funds and the desirability of it. The Brookings report comments on these findings as follows:

> In their replies to a series of questions on this issue, scientists agree that the concentration of Federal funds at a few well-known institutions reflects the present distribution of faculty talent, institutional prestige, research equipment, graduate students, and advisory panels of scientists. (The judgments of social scientists and humanists were similar to those of scientists, although, as a larger proportion are untouched by Federal programs, fewer expressed an opinion about them.) A large majority of faculty at all these groups of institutions agree to these propositions, but the minor differences in the size of that majority at different institutions are amusing and instructive. In group I, more scientists attribute the concentration of funds to the distribution of "faculty talent" than to the distribution of "institutional prestige," whereas in groups II and III, more scientists attribute it to "institutional prestige"—which is natural enough, as neither group wishes to depreciate their own talent. Similarly, more college scientists are prepared to attribute the concentration of funds to equipment and graduate students (which they clearly do not have) than to faculty talent. Scientists in groups

> II and III, who are less represented on advisory panels than group I scientists, are more prone than the latter to hold that panel membership influences the concentration of funds.
>
> Over three-fifths of scientists in group I and over four-fifths of those in groups II and III believe that the present concentration of Federal funds at a few institutions is not in the *long-run* national interest, but there is a significant difference of opinion about whether it is or is not in the *present* national interest. Some 70 percent of group I scientists, who are the principal beneficiaries of present Federal policies, assert that it is; about 55 percent of scientists in groups II and III assert that it is not. . . .

Broadening Programs for Preparation of College Teachers

In the National Defense Education Act there is recognition of the desirability of strengthening graduate programs in more institutions and in wider geographic areas (e.g., the title IV graduate fellowship program). The key to building new centers of strength is to train larger numbers of strong faculty members and retain them in educational institutions. The expansion of fellowship opportunities through Federal and other programs in more departments of more institutions is strongly indicated.

Summary

On the broad question of concentration of Federal funds, the Brookings report contains this statement:

> We see no reason to challenge the essential soundness of the judgment that placed the great national laboratories at a few institutions now receiving several hundred million dollars a year from the Federal Government. There was only one Einstein and one Von Neumann, and they were at Princeton; there was only one Fermi and one atomic pile, and they were at Chicago; one Lawrence and one cyclotron, and they were at Berkeley; one Wiener, and he was and is at MIT. In work of such critical national importance as they and their successors have undertaken, only the best will do, and it would be folly to draw and quarter the Radiation Laboratory, the Argonne National Laboratory, the Lincoln Laboratory, and the Jet Propulsion Laboratory and disperse the segments to other campuses to promote a broader institutional dispersion. So long as these laboratories remain where they are, and until the volume of other federal expenditures for higher education rises far above the current level, a marked concentration of funds at a few institutions will *and should* continue. . . .
>
> But a greater effort is warranted to extend other programs of scientific research and education to more institutions below the doctoral level which do not now participate extensively in them. The desirability of dispersing more broadly among doctoral level institutions funds now heavily concentrated at a few leading universities must be determined by the degree to which this advances the objectives of individual programs.

Reaction to Administration of Federal Programs

To handle the question on the experience of institutions with the administration of Federal programs, inquiry was made to learn what conditions favor growth in Federal-institutional cooperation, and what conditions restrict or hinder such growth, or predispose colleges and universities not to participate. Examination was made of the personal relationships of faculty and administrators with Federal agencies, as well as their opinions on salary and tenure issues, overhead costs, information problems, and the project system.

Relationships With Federal Agencies

Faculty interest in obtaining Federal funds.—About half the university faculty members (groups I and II), and 29 percent of the college faculty (group III) have made application to some Federal agency. Nearly 1 in 4 of the university faculty members had made application 3 or more times, while approximately 8 percent of the college faculty had done so. The similarity in proportion of applicants of group I and group II faculties demonstrates the pervasiveness of interest in Federal support.

The interest shown by group II faculty is proportionately much higher than their success as measured in dollars or contracts and grants received. (Even considering that they have one-half as many faculty members.) In 1957–58, Federal agencies awarded group I universities $42.2 million for scientific research and development by their liberal arts faculty members while group II institutions received $6.0 million.

The agencies to which college and university faculty apply with greatest frequency are: (*a*) scientists—the National Science Founda-

Table 4.—*Percent of faculty members who have submitted an application to a Federal agency for a research grant or contract*

Field	Percent of faculty, by group		
	I	II	III
All fields	52	47	29
Sciences	75	73	56
Social sciences	48	43	23
Humanities	19	16	12

tion, the Public Health Service, and the Navy Department; (*b*) social scientists—the Public Health Service (particularly in the fields of psychology, sociology, and anthropology), and the National Science Foundation, particularly for research which emphasizes experimental and quantitative techniques; and (*c*) humanists—the Department of State and the Office of Education.

Faculty opinion on relationships with agencies.—Most faculty members stated that their applications have been treated "fairly and equitably"; only 14 percent indicated that they felt the Federal agency had been "unfair." Criticisms were more frequent among applicants from group II universities whose applications were not successful.

Federal agencies are criticized more frequently for being inefficient than for being unfair. The complaints deal with delays in decisions, excessive reporting requirements, contract technicalities, and other annoyances attributed to Government procedures. Four out of five faculty members report no discontent.

Administrative problems.—One major problem created by the burgeoning Federal activity involving institutions of higher education relates to administrative organization for the management of multiple contracts and grants. Arrangements are made with many Federal departments and agencies and programs are operated by many university departments and staff members. Patterns of administrative organization for the handling of Government grants and contracts vary widely from institution to institution. In all, the trend has been toward increases in administrative staff and overhead costs. Because of the high degree of decentralization of programs within universities, staff and costs are likely to be increasing at each administrative level.

Certain administrative difficulties are described this way in the Brookings Institution report:

> As the principal investigator deals with his scientific counterpart in Washington, while the university business officer deals with the administrative staff in a different office of the same agency, two distinct streams of information, advice, instruction, and reporting flow between Washington and the campus. Lack of harmony between the scientific and administrative side either in the agency or at the school will quickly be manifested in contradictory instructions or divergent interpretations of the same instruction, in argument over deadlines, advance approvals, budget alterations, travel authorizations, and salary charges. . . .
>
> The availability of Federal funds only in certain fields and types of work poses a difficult dilemma for the university administrator. (The dilemma is less serious at colleges, as funds are less abundant there; but even small benefits—reduced teaching loads, new equipment, funds for publication and travel to professional meetings—restricted to science faculty can produce aggravating problems in a tight-knit college community where everyone knows what everyone else is doing.) If he is too strict about not permitting his scientists and engineers to undertake lines of work which he regards as

inappropriate for an educational institution (e.g., routine testing, or work requiring a delay in publication to protect company's commercial advantage), he may lose them to a rival and more lenient institution. But at least he approaches *that* problem with a clear idea of what kind of work is and is not appropriate at his institution.

More intractable is the problem of setting a limit to the *volume* of research in a legitimate academic area. The traditional conception of a balanced community of single and equal scholars can be maintained in form by limiting the number of tenured faculty appointments. But it is lost in substance when a professor of physics manages a laboratory with a staff of secretaries, purchasing clerks, technicians, senior postdoctoral associates, and a flock of graduate research assistants, whereas his colleagues in history, philosophy, or Latin do their own filing, typing, and longhand notetaking. Scientific research at our great universities has become an industry—the "industry of discovery," Sumner Slichter called it—whereas the humanities remain handicrafts. Perhaps there is a university president who has told an esteemed professor, "Your work is splendid at a $50,000 level, but I cannot permit it at $5 million a year" and thereby sacrificed a good man and a good program to maintain a better balanced institution. But the more common solution is to segregate the professor's research establishment from the academic community, thereby maintaining both the real research industry and the nominal academic balance.

Faculty views on the emphasis on research.—Three-fourths of the faculty members in groups I and II and more than one-half of those in group III believe their institutional administration favors the faculty member with Federal research funds more than the member without such support. Faculty members tend to believe that their faculty colleagues hold the two members in equal esteem, assuming that they are of equal teaching and research ability.

Faculty views on the role of the Federal Government.—To the question, "What is your view on the overall issue of the role of the Federal Government in higher education?" faculty members were asked to select one of these responses:

1. "Federal programs are necessary and desirable in the national interest regardless of the financial condition of colleges and universities."
2. "Federal programs are unfortunately necessary, but it would be best for the Nation if colleges and universities could do without them."
3. "Federal programs are unnecessary and should be discontinued."

More than 60 percent in each of the three groups selected the first response, while approximately 37 percent in each group selected No. 2, and 1 percent in each chose No. 3. Approximately 75 percent of the social scientists in each group and 63 percent of the humanists in each group selected the first response. As for the scientists, 58 percent in group I, 52 percent in group II, and 45 percent in group III chose the first response.

Salary and Tenure Issues

A policy problem of considerable moment to institutions is to what extent, if at all, to pay the salaries of tenure faculty members from funds connected with Federal (or other outside) projects. In 1960–61, a fourth of the scientists in group I institutions responded that they had received a part of their salaries from their federally sponsored projects. While the policies of Federal agencies and departments are not uniform, the trend is toward permitting such use of funds.

Institutions sometimes release faculty members from part of their teaching responsibilities to participate in federally sponsored research and figure the cost of this released time in the budget for the Federal project and contract. The funds received from the grant or contract are then used to employ other persons to teach the courses from which the principal investigator was released. The substitutes are usually part-time and nontenure staff members. Institutions have been reluctant to depend upon these practices because of the short-term nature of contracts and grants. Older faculty members, in general, prefer the situation in which research and teaching are considered twin responsibilities, both funded by the institution in like manner.

Faculty members frequently feel that the practice of including faculty salaries as well as administrative costs that are extraneous to the cost of research per se in budgets for Federal research projects, not only disturbs the proper relationship of a faculty member to his institution but also reduces the potential support of research activity. For this and other reasons researchers frequently prefer to have their institutions pay faculty salaries and other costs incidental to research. Many administrators might also prefer such a policy, but few, if any, can possibly adopt it and maintain research activity at its present level.

Overhead Costs

The most disputed area of Federal policy is probably in the treatment of "overhead" or "indirect costs" in the reimbursement of institutions for "purchased" or "supported" research. The principal problems lie (*a*) in determining a method of defining accurately and equitably just what constitutes the full indirect cost and how it should be computed; and (*b*) whether, in principle, the government *should* pay the full indirect (*and* direct) cost of all its research programs at educational institutions. It is clear that as institutions render more and greater services in federally sponsored programs, and as their independent resources dwindle in relation to their growing responsibilities, the drive to secure full reimbursement of the cost of operating

federally sponsored projects will intensify. One suggestion has been the possibility of funding only direct costs for individual Government projects within an institution, while indirect costs for all Government projects (at least those of any one agency) in that institution would be paid by the Government in a lump sum. Only time will tell whether this type of funding or some other procedure will evolve. The multiplication of projects and attendant administrative costs, however, seems to indicate a need for more simplified procedures.

Information Problems

Faculty members in the social sciences and the humanities evidently know less about the Federal programs in their fields than do the scientists about science programs; at least many of the former would like more information. Their programs are newer, and the faculty members in these fields are less accustomed to assistance from outside sources of any kind. The study suggests, however, a general curiosity and interest on the part of more than half the faculty.

More people (particularly scientists) in all types of institutions know officials of the National Science Foundation than those of any other agency which distributes Federal funds. This fact no doubt reflects the broad nature of National Science Foundation programs, including research, institutes, and curriculum improvement programs at both undergraduate and graduate levels. It is significant too that programs in the humanities reach only a comparatively small segment of an institution's faculty members and promote acquaintanceship with Federal program officials among only a few individuals.

There is the ever-present need for better and more accessible information about Federal programs, the fields and levels of higher education they involve, the objectives of the programs, the criteria used in making awards, and the offices with which to correspond. The broadening of personal acquaintance between agency and institutional personnel would evidently also be useful.

Project System

Many of the criticisms of federally sponsored programs by college and university representatives center around the use of the project system, which grew up in connection with the purchase of specified services during war periods.

The most frequently expressed criticisms of the project system are these:

1. **It takes too much time of faculty members in administrative details: writing proposals, keeping records of progress, and submitting reports.**

2. It favors "projectable" research, in which methods are standard and results predictable. Proposals which are venturesome, imaginative, and bold in concept or plan are less likely to be selected.
3. It encourages "empire building." This criticism points to a practice, when permitted, in which faculty members form teams which by pyramiding contracts and grants are able to acquire a large corps of assistants, purchase considerable research equipment, and enlarge their staffs.

These points are raised in support of the system:

1. The use of the project system is needed to insure quality of result. It is difficult to improve upon a system in which proposals are accepted on the basis of judgments by leaders across the nation in one's own field of activity. If all research funds were to be given to the institutions for distribution by the institution, complex judgments and considerations unrelated to quality of the research effort would be introduced.
2. The use of the project system keeps the research worker and his activity at the center of the program.

The Brookings Institution report comments:

> The argument is made that, by a kind of natural law of scholarship equivalent to the laws of the marketplace, whatever a scholar wants to do is ultimately in the national interest, and the argument has gradually proved persuasive to Congress in its support of basic research in the natural sciences. But even here, carte blanche is not given; under the project system, the Government does not write a blank check to every or any scientist to do everything or anything that he wants, but requires periodic evaluation of his work by the men best qualified to give it. And this is quite reasonable and right.

Trends Toward Broader Support

As Federal programs have multiplied and their purposes have become more diversified, the sponsoring agencies have been shifting gradually from contracts to grants as the vehicle for allocating funds.

Two other trends are visible:

1. The growing volume of individual project proposals is prompting moves toward approving departmental projects, or projects covering broad areas of research fields.
2. The institutional grant is cautiously entering the family of Federal programs. As one example, an institution may receive a stated percent of the amount of research funds received in the previous year as a grant to use as needed in the improvement of its research programs (in the fields supported by the Federal funds).

The Brookings report summarizes:

> Government programs have developed along two administrative lines: the project system, in which funds are controlled by individual faculty for designated purposes; and various forms of aid for broader purposes, in which funds are controlled by various alliances of faculty or by higher administrative officers. Both methods of support are needed: the project system

is vital to the maintenance of high professional standards and the freedom of the individual investigator; broader forms of support are desirable to strengthen neglected scientific and educational areas. In both systems, it is important to emphasize criteria of quality and to resist pressures to distribute money on the basis of a mathematical formula.

Need for Vigilance

Dangers lie in the subtle influences which may cause academic interest and activity to shift from the traditional objectives and programs of educational institutions to involvement in, and preoccupation with, the externally defined urgencies of national and international affairs. Such a shift could in the long run be more diverting and dangerous than the much expressed fear of control by Federal "bureaucrats" or intrusion into academic affairs by congressional committees or Federal investigations. The major safeguard to institutional independence is a strong faculty which individually and collectively refuses to be diverted from its basic obligations both to the central purposes of education itself and to the institution it serves.

PART III

Observations, Conclusions, and Recommendations

Introduction

Title X of the National Defense Education Act calls not only for information on Federal programs but the development of "policies and procedures which will strengthen the educational programs and objectives of the institutions of higher education. . . ." Toward that end the following observations, conclusions, and recommendations based on parts I and II of the survey are presented by the survey director to the Commissioner of Education. The members of the Advisory Committee were not asked to approve them.

Observations

- Strong social forces, national and international, are welding closer bonds between the Federal Government and the Nation's institutions of higher education.

- Federal activity in colleges and universities has three central purposes:

  1. To make full use of the resources immediately available for the accomplishment of urgent national goals.
  2. To strengthen these resources as required by the national security or interest.
  3. To increase the level of educational attainment, including specialized knowledge and technical skills, of able American youth.

- Federally sponsored programs are usually mission oriented, concentrating in basic science, space science, engineering, agriculture, health or technical assistance to other countries. With few exceptions, the programs are not conceived as measures to strengthen colleges and universities as such.

- Colleges and universities are a prime resource for the accomplishment of specific objectives of the Federal Government. The participation of institutions of higher education for these purposes is vast and growing.

• Most of the Nation's accredited colleges and universities (approximately 75 percent) participate in at least one of the Federal programs in education. The programs that have funds most widely diffused are those for student loans, assistance to veterans, and college housing loans. For other programs, such as those in research, the funds are highly concentrated in universities that have strong graduate programs, particularly at the doctorate and postdoctorate levels.

• The high degree of concentration of Federal funds results primarily from two sets of circumstances:

1. Most Federal funds are expended in programs which call for large-scale research activity and training at the highest levels of specialized knowledge and technical skill.
2. The number of institutions of higher education that can match such requirements of Federal missions is limited. Approximately 200 institutions confer doctorates, and in many of them the programs are limited in scope.

The Nation's prime resource for Federal programs of the level and type now sponsored lies within 25 to 50 universities; within these institutions there are wide variations in strength.

• The Federal Government has established relationships with institutions of higher education along two major patterns:

1. *Federal-State relationships.*—In this pattern, both Federal and State appropriations are provided for use in institutions designated by the States for the accomplishment of certain goals, such as those of the 100-year-old land-grant program in the field of agriculture and mechanical arts.
2. *Federal-institutional relationships.*—In this pattern, Federal departments and agencies award contracts or grants to individual institutions for specific projects or programs. This pattern developed in war periods when the resources and facilities of colleges and universities, both private and public, were needed and used by the Federal Government.

Each of these patterns has advantages and disadvantages. Both offer possibilities of adaptation to the needs of the future.

• Federally sponsored activity and funds are becoming a built-in feature of the function and finance of major universities. Substantial proportions of the operating budgets of schools of medicine, public health, engineering, and divisions or departments in the natural sciences are now derived from Federal funds. The effect of sudden withdrawal of federally sponsored activity from these fields would be as traumatic as the sudden withdrawal of Federal contracts or subsidies from many major industries.

• The areas of interdependence between the Federal Government and the institutions of higher education are broadening. Federally sponsored programs directly related to military defense or national

security no longer have the major part of funds for Federal activity in higher education. Programs in basic science, space science, and health together now claim the major share.

- Federal activity has had two distinct types of impact upon the programs and objectives of institutions of higher education:

1. It has greatly expanded the dimensions of the research activity and function within colleges and universities.
2. It is widening the responsibilities of institutions of higher education for public service by tapping their resources for leadership in cooperative assistance programs and educational activities in other countries.

- The growing responsibilities for specialized service in the national interest are striking colleges and universities at a time when they must prepare for unprecedented student enrollments, when shortages of qualified teachers in many fields are becoming severe, and when their financial resources are strained to meet their traditional and basic educational obligations.

- Studies within individual colleges and universities indicate that federally sponsored programs have strong and pervasive influence upon institutional policies and programs. Although these influences are strongest among institutions directly and heavily involved in Federal programs, repercussions are felt throughout the structure of higher education. The situation causing greatest concern in the academic community is the differential impact of federally sponsored activity upon—

1. Well-established universities with strong faculties and high prestige in comparison to young institutions with smaller resources that are trying to develop greater strength;
2. Institutions that have graduate programs in comparison to institutions that have undergraduate programs only;
3. Research activities and functions in comparison to teaching objectives and functions; and
4. Fields strongly supported in comparison to those not supported, or much less supported.

- Current Federal activities tend to increase the gap between the strong and the less strong institutions, to further the separation of graduate from undergraduate instruction, to increase the reward and prestige of research in comparison with teaching, and to lower the morale of faculty members in fields not well supported.

- The objectives of higher education and the missions of the Federal Government are not always congruent. Colleges and universities strive for unity, balance, and excellence throughout their programs. Federal departments and agencies stimulate excellence in selected activities and fields. Federal activities, therefore involve only segments of an institution, pieces of its programs, and parts of its purpose.

• Criticism of federally sponsored programs is counterbalanced by judgment that the use and development of the strongest centers of research and graduate education have been right and necessary; that research has long been underfinanced in most institutions; that the emphasis on research activity redounds to benefit the quality of instruction.

• Problems cited by administrative heads of colleges and universities as arising from current trends in their institutions include—

1. The tendency of some faculty members to identify with the special missions of Federal agencies more than with the overall objectives of their institutions.
2. Difficulty in meeting conditions of space, facilities, released time, and cost of participating in Federal programs.
3. Difficulty in avoiding differential and inequitable treatment of equally deserving faculty members, some of whom are unable to participate in Federal programs.
4. Difficulty (especially in undergraduate colleges) of attracting and keeping well-qualified faculty members who must have time and facilities for research.
5. Bypassing of statewide and regional boards of higher education through direct Federal-institutional agreements.
6. Difficulty in securing adequate reimbursement for the cost of participation in federally sponsored programs.

• The issue of Federal control over educational programs and objectives of higher education seems to be debated more vehemently in citizen groups than in education circles. There can be no doubt, however, that the influence of Federal programs in the fields of expressed national interest is strong. The issue is whether an institution of higher learning will permit purposes of any external origin to become a controlling influence over its objectives and programs, and whether it will have the courage and character to withstand unwarranted intrusion, political or other, in the educational domain.

• Representatives of institutions of higher education generally feel that Federal research and current educational programs should not have centralized administration. They hold that the role of the Federal Government should be supplemental only, and that to centralize would move the Government toward a commanding position. They also prefer the multiple chance and choice afforded by a diversity of sponsoring agencies.

• In general, faculty members and administrators in the institutions participating in federally sponsored programs consider that Federal activity has been appropriate, beneficial, and constructive; that most of the operational difficulties are being eliminated with experience; and that there is a greater danger in weak policies and

standards of participating institutions than in any dictatorial tendencies of Federal agencies and departments.

Conclusions

Creating more centers of strength.—The potential of many colleges and universities is not as fully developed as that of others. Since the Nation needs a larger cohort of truly strong institutions than that upon which it now heavily depends, there is probably no wiser course for the Federal Government than to continue to expand its support of research in a widening circle of institutions and to expand programs designed to increase the supply of highly qualified research workers and college and university teachers.

Investing in education.—Larger investments should be made in imaginative inquiry and experimentation in education. Obsolescence of plant, facilities, materials, or processes should not be tolerated, since educational obsolescence handicaps progress of any kind.

Nourishing excellence.—The basic need of any college or university is the means to be strong—strong enough to attract excellent teachers and students, and strong enough to define its own purposes, maintain its integrity, and protect its independence. The Federal Government should function in an initiating and supplemental role. Some specific measures for this are:

1. Protecting, stimulating, and encouraging increased and diversified support from all sources, public and private.
2. Providing assistance with the mounting needs for capital facilities: classrooms, libraries, offices, laboratories, dormitories, and other student centers.
3. Permitting greater flexibility in the use of restricted funds within the purposes of specific programs.
4. Allowing payment of full costs of programs in which services are purchased, and incremental costs of other types of programs.
5. Developing programs which will attract, honor, and reward college teachers and recruit able youth to the teaching profession.
6. Sponsoring programs which update and improve materials and methods in all fields of instruction.
7. Identifying, establishing, and supporting new types of programs that are beyond the resources of single institutions.
8. Developing programs that better accommodate, stimulate, and utilize the resources of undergraduate colleges.
9. Consulting educational institutions during the formulation of programs in which the institutions are expected to participate.
10. Initiating programs that will first reduce, then eliminate existing islands of neglect by insuring full educational opportunity for all.

Coordinating Federal programs.—The basic need for improvement in Federal activity is in the formulation of general policy and the provision of information about the programs. The administration of programs should remain with the agencies responsible for specific missions and should not be centralized. Consideration should be given, however, to the coordination of programs so that they do not work at cross purposes but rather reinforce each other. The fresh Federal interest expressed by the enactment of the National Defense Education Act, the recent reorganization of the staffing pattern of the Office of Education, and the growing perception of the importance of educational institutions in achieving national goals, all furnish signs that new and stronger recognition of education is developing in the legislative and administrative arrangements of the Federal Government. There are also efforts within the circles of higher education to provide a more effective coordination of the efforts of their spokesmen on issues of concern to all institutions.

The Federal Government needs a mechanism for providing a general overview of its numerous programs scattered among many departments and agencies. There is strong opposition among both university and Federal administrators to arrangements which would centralize the administration of Federal programs in higher education in a single agency. There is, however, general support for an arrangement which would yield the following benefits:

1. A centralized information service concerning Federal activities;
2. Continuous and perceptive review of the panorama of federally sponsored programs;
3. Comprehensive, systematic, and reliable nationwide studies of major trends and conditions affecting or likely to affect the welfare of the Nation's colleges and universities;
4. Nationwide comprehensive studies of the factors affecting full realization of educational opportunity among American youth; the supply of college teachers, including the migration of faculty members; the recruitment of prospective college teachers; and other factors affecting the quality of institutions of all types.

The Department of Health, Education, and Welfare is the natural center for this kind of activity. It now reaches colleges and universities with the widest front of educational programs and with the broadest base of interest and experience of any Federal department or agency. This Department, however, has not established itself as one to which the academic community turns for assistance in understanding or guiding Federal policy and programing in higher education. The Department's principal component in education, the Office of Education, has too long been identified in the minds of the academic community with the problems of professional educators more than

with the interests of the academic disciplines, with the aspirations of administrators more than the purposes of professors, with service to education associations and groups more than with the general concern of all with broad educational problems.

Recommendations

The survey director recommends—

That the Department of Health, Education, and Welfare, through its Office of Education, give continuing consideration to the problems and policies studied in this *Survey of Federal Programs in Higher Education.*

That the Department strengthen itself and the Office of Education, through appropriate organizational and staffing patterns, as a center within the Federal Government through which overall problems and policies in higher education may be considered with effective participation by representatives of all Federal departments, agencies, and branches, by institutions of higher education and their related associations, societies, and councils; and by citizen groups.

That the responsibilities for developing Federal policies and procedures to strengthen the Nation's resources in higher education be carried on in consultation with a standing committee or council of advisers who have national stature and whose understanding of higher education and its role in our society is commensurate with the importance of wise solutions to the Nation's educational problems.

The director further recommends—

That the Office of Education continue to provide information of the type developed in this *Survey of Federal Programs in Higher Education* with such modifications as seem desirable. The incorporation of financial data such as that now provided in the Office of Education publication, *Federal Funds for Education*, is recommended, as is the addition of more complete information on inservice training programs for Federal employees, both military and civilian.

That the Office of Education develop additional studies of the impact of Federal policies and programs on higher education, such as a study of Federal tax policies affecting higher education.

That the Office of Education develop new statistical studies to provide nationwide information on the following topics (data to be collected from the institutions of higher education):

1. *Migration of faculty members.*—Annual data on faculty arrivals and departures by field, with notation of the position left or assumed, whether

in college or university, nonacademic position, retirement, or whatever activity.

2. *Subvention of graduate students.*—Data by institution and field on the costs of graduate study to students; the number of graduate students holding fellowships, traineeships, assistantships, or other positions with financial aid; and the amounts of this assistance. Data on student support should indicate the source of support; i.e., Federal Government, State government, foundation, institution, etc.
3. *Support of international education programs.*—Data by institution on the funds and personnel involved in educational programs overseas, both government- and nongovernment-supported.

That the Office of Education direct more of its statistical study to illuminate important policy questions in higher education. The Office now supplies much detailed and valuable information that is organized primarily for reference. More data should be collected, however, that specifically relate to significant educational issues and problems, for example, State-by-State information on the availability and need for student assistance.

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